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IS 6652-2 (1986): Glossary of terms relating to metal forming machines and tools, Part 2: Metal forming machines relating to sheet metal [PGD 4: Metal Forming Machines]



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*Indian Standard*GLOSSARY OF TERMS RELATING TO METAL
FORMING MACHINES AND TOOLS

PART 2 METAL FORMING MACHINES RELATING TO SHEET METAL

(First Revision)

1. Scope — Covers the definitions of terms relating to metal forming machines for sheet metal working.

2. Definitions**A**

2.1 Adapter Plate — An additional plate mounted on ram or bolster to adapt tool or tools.

2.2 Adjustable Bed — Bed of a press mounted and guided in press frame and provided with a suitable mechanism for varying the shut height or press.

2.3 Adjustment of a Slide — The distance through which the slides can be moved between its extreme limits on screw.

2.4 Arbor Press — A manual or power operated machine normally used for forcing arbors or mandrels into drilled or bored parts. Also used for forcing bushings or pins into or out of holes and for other similar work.

B

2.5 Beading Machine — A special purpose machine to perform beading operation.

2.6 Bed of a Press — The stationary part of the press serving as a table to which is fixed the bolster and sometimes the die directly.

2.7 Bench Press — A small press which is mounted on a bench or table.

2.8 Bolster — The plate or block secured to the bed or slide of a press upon which the press tool is fastened.

2.9 Brake — The friction mechanism used for stopping the motion of a press slide, feed or any other device.

2.10 Bulldozer — Slow-acting horizontal press with generally a large bed used for bending, straightening, etc.

C

2.11 Cam Press — A mechanical press in which one (or more) of the slides are operated by cam. Usually double action press with blank holder slide operated by cam.

2.12 Capacity of a Press — The maximum force that a slide of a press can exert.

2.13 Chute — A trough or inclined plane with guides, down which parts, scrap, etc, slide or roll either in being fed to a magazine or directly to a press or in being ejected from a machine.

2.14 Clutch — A coupling used to connect or disconnect a driving machine member from a driven machine member.

2.15 Coil Cradle — A device for supporting a coil on its periphery and allowing rotation of coil while being unwound.

2.16 Crank Press — A mechanical press the slide of which is actuated by a slider crank-mechanism, to convert the circular motion to linear motion.

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2.17 Crimping Machine — A special machine for a forming operation to setdown or close-in a seam.

2.18 Crown — The top assembly of a straight sided four-piece construction press.

D

2.19 Daylight — The distance from top of bolster/bed to bottom of slide with slide fully up. This term is mostly used in case of hydraulic press.

2.20 Dial Feed — The mechanical press feed in which the work pieces are fed to the press tool by rotating disc or dials.

2.21 Die Cushion — An accessory on press which gives additional motion and force usually in the direction opposite of slide motion.

2.22 Dieing Press — A small high speed press in which the slide is operated by pull rods extending down through the bed where they are connected to a plate which is actuated by the drive mechanism located underneath.

2.23 Die Spotting Press — A hydraulic or mechanical press used to aid removal of high spots on profile, contour, etc, of a female member of a die with a male member or vice versa to match them.

2.24 Double Action Press — A press having two independent co-axial moving slides and having independent motion.

2.25 Drop Hammer — A mechanical equipment in which a falling weight is used as the device to exert force.

2.26 Drum Feed — A special feed in which the work pieces are located in the contoured cavities on the periphery of the drum which is mounted in the die space of a press. The blanks are loaded at the front of drum carried to the top where operation is performed and the parts are discharged at the back.

E

2.27 Eccentric Press — A mechanical press in which eccentric mechanism is used to get linear motion from a rotary motion.

2.28 Endwheel Press — A gap frame mechanical press in which the flywheel is at the back of press and the eccentric shaft is located front to back.

F

2.29 Flat Edge Trimmer — A machine for trimming quickly, accurately drawn shells of almost any shape to plain straight edges or irregularly notched edges.

2.30 Flying Cut-Off Device — A shear, saw, die, etc, equipped with a provision to move during its working stroke in the same direction and at the same rate as a long piece of metal which is simultaneously worked.

2.31 Fly Press — A manually operated mechanical press which has a fly weight directly mounted on the spindle, which moves down or up when the wheel is rotated.

2.32 Flywheel — A wheel used as an energy accumulator on a machine and whose rotational energy is used to prevent excessive or sudden changes in speed.

2.33 Folding Machine — A machine either hand or power operated, for folding and lock forming of strip or sheet material.

2.34 Foot Press — Small size and small capacity press actuated entirely by foot pressure.

G

2.35 Gang Slitter — A machine with number of pairs of rotary cutters, spaced on two parallel shafts, used for shearing sheet metal into strips or for trimming the edges of coiled sheet stocks.

2.36 Gap Frame Press — A general classification of presses in which the uprights are made in the form of letter 'C' thereby making three sides of the space available for mounting dies, tools, accessories, etc.

2.37 Geared Press — A press whose main drive shaft is connected to the driving source through one or more sets of gears.

2.38 *Gibs* — Guides which ensure proper sliding fit between two machine parts and which usually are adjustable for taking up excessive wear.

2.39 *Grip Feed* — This is a feeding device in which reciprocating head carrying a gripper shoe clamps the stock tightly on feeding movement and releases it on return stroke.

2.40 *Grooving Machine (Groover)* — A rolling machine for forming or grooving and flattening straight line seams in sheet material.

2.41 *Guillotine Shear* — Shearing machine in which the bottom cutting member is fixed on the bed and the other top cutting member is mounted at a rake or inclination to it on a moving member. Action of blades similar to guillotine action causes cutting of sheet.

H

2.42 *Hammer* — General classification of machines used for hot or cold forming by impact, thereby causing materials to deform at larger velocities than in the cases of presses.

2.43 *Horn* — A cantilever block or post which acts as the die or to which the die is fastened on a press.

2.44 *Horning Press* — A press equipped with a horn for doing operations, such as forming and piercing.

2.45 *Hydraulic Press* — A press whose slide or ram is actuated by a hydraulic cylinder whose pressure is obtained from hydraulic pump.

I

2.46 *Inching Device* — An electro-mechanical device with slow movement of a slide to a desired distance with or without load.

2.47 *Inclinable Press* — A press which may be operated in inclined position also to facilitate ejecting of finished parts by gravity.

2.48 *Inclined Press* — Any press having the frame in fixed inclined position. The line of action of the ram is not vertical, but inclined.

J

2.49 *Jaw Clutch* — A positive clutch in which male and female jaw parts are made to mate when the clutch is engaged and those parts are forced apart while disengaging clutch.

K

2.50 *Knuckle Joint Press* — Comparatively a short stroke press in which the slide is directly actuated by knuckle joint which is closed and opened by means of a connection and crank. In this process a knuckle mechanism used to convert rotary motion into a reciprocating motion.

L

2.51 *Load* — With reference to a press the load is the amount of force which the press is exerting to do the process in question.

2.52 *Locking Device* — A device to lock cushion travel for a desired distance on return stroke.

M

2.53 *Magazine* — A holding and guiding device in which parts, such as blank shells or other fairly regular shaped pieces can be stacked or otherwise uniformly positioned for feeding to a machine.

2.54 *Magazine Feed* — A magazine in combination with ratchet pawl or escapement or reciprocating slide for feeding one piece at a time to the press tool.

2.55 *Mechanical Press* — A press in which a mechanical device such as crank, eccentric, cam toggle, knuckle, etc, is used to convert the rotary motion into a reciprocating motion.

2.56 *Motion Diagram* — A graph or curve which shows motion of slide either relative to the motion of driving member, such as rotation of crank or with respect to time.

2.57 *Multiple Point Press* — A press in which the slide is operated by applying pressure at more than one point, for example, two-point press, four-point press, etc.

2.58 Multi-Slided Press — High productive automatic punching or forming press having two or more slides actuated by cams to perform various operations progressively. This is used to produce components having operations such as cutting, coining, bending, embossing, marking, etc. Deep drawing is not generally performed in this press.

N

2.59 Nibbling Machine — A machine used for contour cutting of sheet metal by a rapidly reciprocating tool which makes numerous small cuts.

O

2.60 One-Piece Frame — A press frame combining bed, uprights and crown into a single casting or a single weldment.

2.61 One-Point Press — A mechanical press whose slide is actuated by one crank and connection link.

2.62 Open Back Inclined Press (OBI Press) — Press with opening at the back between the two uprights and with type of frame that can be inclined.

2.63 Open Red Press — A hydraulic press with side members consisting of vertical cylindrical rods which are spacers between bed and crown upon which the slide is guided.

2.64 Outside Slide — A slide mounted on the outside of an upright of a straight sided press used for cut off or other press operation.

2.65 Overhead Drive Press — Any mechanical press with driving mechanism mounted on crown or upper part of uprights.

2.66 Overload Safety Device — A device to stop the main power source when the machine gets overloaded beyond a desired load.

P

2.67 Pitman — It is part or whole of connecting rod to transmit motion and force from a revolving crank or eccentric to a slide.

2.68 Plate Bending Rolls — A machine equipped with three or more rolls to form a curved sheet.

2.69 Pre-fill Valve — A pilot operated check valve with large port for admitting oil to, or discharging oil from the main cylinder of a hydraulic press at no-load portions of a stroke.

2.70 Press — A machine having a stationary bed or anvil and a slide which has a reciprocating motion toward and away from the bed surface and at right angle to bed surface, the slide being guided in frame or press to give a definite path of motion.

2.71 Press Brake — A form of open frame single action press comparatively wide between the housings with a long narrow bed and slide.

2.72 Push Feed — Any mechanical feed that pushes the part to the die or from one die to the next in progressive dies.

R

2.73 Ram (Also Called Slide) — The main reciprocating member of a press, guided in the press and to the which punch or the top tool assembly is clamped.

2.74 Reducing Press — A long stroke, single action, single crank press used for redrawing and other bending or forming operations on deep shell.

2.75 Reel — A revolvable device consisting of hub or spool and side guides upon which strips of material or wire may be wound or unwound for ease in handling or feeding to a press or other machines.

2.76 Roll Feed — An automatic device for feeding the strip stock from a coil.

2.77 Rolling Key Clutch — A positive clutch in which oscillatory motion of cylindrical key about its own axis in the groove on the shaft causes engagement or disengagement of the driving and driven parts.

2.78 Roll Leveller — A power driven mechanism consisting of a series of staggered rolls for repeated flexing of sheets or strips for cold working preparatory for use in drawing or forming operation, thereby producing a flat surface.

2.79 Roll Straightener — A rolling mechanism consisting of a number of staggered rolls between which sheet or strip stock is passed for straightening. The device is usually used in conjunction with a coil cradle and roll feed mechanism to feed coiled stock.

2.80 Rotary Shear — A cutting or shearing machine with two rotary disc cutters with or without circle cutting attachments.

S

2.81 Scrap Cutter — A cutter operated by press, and usually made a part of, or at least attached to, roll feed or press tool and used for cutting scrap into short lengths for convenience of disposal.

2.82 Screw Press — A press in which a screw and a nut mechanism is used to convert a rotary motion into a reciprocating motion.

2.83 Scroll Shear — A special shearing or cutting machine with special contour knives for shearing along an irregular line.

2.84 Seaming Machine — This is a machine which provides means for holding or clamping the work and then with a series of folding operations performs the flanging, curling and setting down of the seam.

2.85 Shear — A machine for cutting any material by the closing motion of two closely adjoining sharp edges.

2.86 Shear Pin — A drive member in a safety shaft coupling which is designed to fail at predetermined torsional load (or overload) on the shaft.

2.87 Shear Plate — A load transmitting plate usually placed somewhere between the slide and the connecting link of a press designed to fail at a predetermined load.

2.88 Shut Height of a Press — It is the distance from the top of the bed bolster to the bottom of the slide with maximum stroke down and adjustment up.

2.89 Side Wheel Press — A general classification of presses with left to right shaft and flywheel located on the side.

2.90 Single Action Press — A press with a single slide and without any other motion or pressure device operated by a main drive.

2.91 Slide — The main reciprocating member of a press, guided in the press frame and to which punch or the top tool assembly is clamped.

2.92 Slide Feed — A feeding device which employs a reciprocating slide to which are attached gripping fingers for feeding strips or parts.

2.93 Squaring Shear — A shearing machine consisting essentially of one fixed blade usually mounted on bed and one moveable blade mounted on ram which is guided in the guide ways on frame. The side gauges are bolted square with the cutting blades, for guiding the sheet for making cuts which are square with the sides of the sheet.

2.94 Stock Oiler — A device for spreading oil or lubricant over the faces of sheet or strip stock.

2.95 Straight Sided Press — A mechanical press with uprights or housings having plain flat sides which enclose the right and left side of die space.

2.96 Stretch Press — A press in which sheet metal is clamped and a ram carrying punch comes up to form a part. The part takes the shape of the punch.

2.97 Strip Feed — An automatic device for feeding the strip stock one at a time from a stack in magazine or holder.

2.98 Stroke of a Press — It is the travel of the press slide between the terminal points of motion.

T

2.99 Throat Depth — The clear distance from the centre line of the ram backwards to press frame.

2.100 Tie Rod Frame — A frame construction of presses in which steel tie rods extend through the opening in the bed, uprights and crown and securely hold these parts together under stress.

2.101 Transfer Press — A press having multiple slides or plungers which may be individually adjusted and timed; and having front-to-back roll feed at first blanking station and transfer feed with gripping fingers for carrying the piece to successive stations for piercing, forming or drawing operations.

2.102 Trimming Press — A mechanical or hydraulic press extensively used for trimming the flash from drop-forging.

2.103 Triple Action Press — Mechanical or hydraulic press having three independent slides with co-axial motion generally two from the top and one from the bottom.

2.104 Tripping Mechanism — Any auxilliary mechanism either manually or automatically operated, which starts, stops or otherwise controls the operation of primary mechanism. In presses, tripping mechanisms are used to engage or disengage positive clutches.

U

2.105 Under Drive Press — A mechanical press in which the driving mechanism is located within or under the bed.

V

2.106 Vacuum Cup Lifters — A mechanism for lifting or moving blanks or strips from a stock by means of suction cups attached to handle or lifting or feeding arms.

EXPLANATORY NOTE

This standard was first published in 1973, to cater the needs of metal forming industry for standardization of terms used in connection with metal forming machines, processes relating tools and their components in order to assist the correct interpretation of common terms used in this field.

The Committee responsible for formulation of this standard decided to revise the same based upon experience gained in implementing this standard over so many years. In the present revision, some terms have been deleted and some additional terms have been included.

This standard forms Part 2 of the glossary of terms. The following other two parts have also been revised:

Part 1 — Metal forming tools; and

Part 3 — Metal forming technology and operations relating to sheet metal.

In preparing this standard, assistance has been derived from the following publications:

- a) Die design Handbook, 2nd Edition, issued by Society of Manufacturing Engineers, U.S.A.; and
- b) Metal Handbook, Volume 4, Forming, issued by American Society of Metals, USA.